02/03/14 Agenda:

- Warm Up Problem

- Review Quiz

- Sections 7.5-7.6 - Trigonometry Ratios
    - Activity - Right Triangle Investigation
    - Sine, Cosine, & Tangent Ratios

- Homework - Worksheet 6 - Trig Ratios

Name: _____

## Triangle Angle Relations

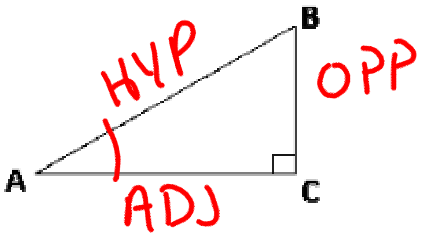
Which side is the **HYPOTENUSE**? AB

Which side is **OPPOSITE** from angle **A**? BC

Which side is **ADJACENT** to angle **A**? AC

Which side is **OPPOSITE** from angle **B**? AC

Which side is **ADJACENT** to angle **B**? BC




## INVESTIGATION:

1. Draw a vertical line **anywhere you want** along angle A (use a protractor to make sure you have a 90-degree angle at the bottom!). Your triangle should be a different size than other students.
2. Label the right angle with a "C" and the top vertex of your triangle with a "B" – it should be labeled just like the triangle at the top of this page.
3. Use a protractor and ruler to find the following measurements for your triangle:

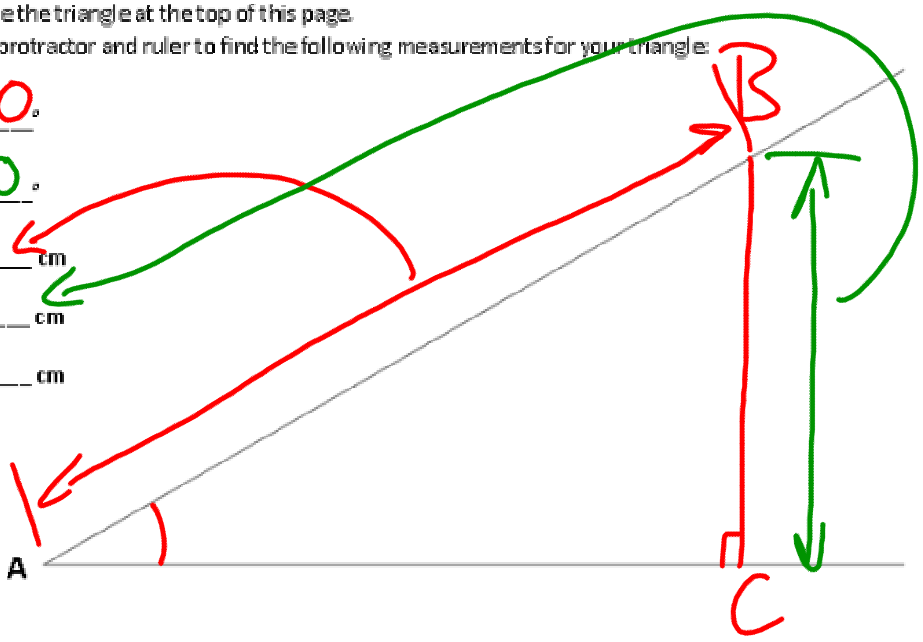
m∠A = 30°

m∠B = 60°

AB = _____ cm

BC = _____ cm

AC = _____ cm




4. Now we will form RATIOS of sides. Divide on your calculator and round to two decimal places.

From ∠A: $\frac{opposite\ side}{hypotenuse} = \frac{BC}{AB}$ $\frac{adjacent\ side}{hypotenuse} =$ $\frac{opposite\ side}{adjacent\ side} =$

From ∠B $\frac{opposite\ side}{hypotenuse} =$ $\frac{adjacent\ side}{hypotenuse} =$ $\frac{opposite\ side}{adjacent\ side} =$

∠A

$\frac{OPP}{NYP} = .47 \quad .4 \quad .53$
$\quad\quad\quad\quad .50 \quad .5 \quad .5$

$\frac{ADJ}{NYP} = .88 \quad .86 \quad .8 \quad .88$
$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad .83$

$\frac{OPP}{ADJ} = .53 \quad .5 \quad .5 \quad .58$

∠B

$\frac{OPP}{NYP} = .8 \quad .93 \quad .84$

$\frac{ADJ}{NYP} = .53 \quad .47 \quad .5$

$\frac{OPP}{ADJ} = 1.58 \quad 1.66 \quad 1.73$

5. Compare answers with classmates around you!
    a. What do you notice about the ANGLE measures of your triangles?

    b. What do you notice about the SIDE lengths of your triangles?

    c. What do you notice about the RATIOS of side lengths you calculated above?

6. Is there a geometric concept we can use to explain why this is true?

**Sections 7.5 & 7.6 - Intro to Trig Ratios** **Target 7C**

February 3, 2014

| | |
|---|---|
| Goal: | To understand and apply the 3 basic trigonometric relationships in right triangles. |
| Todays Takeaways: | 1. Given a right triangle, find the sine, cosine, and tangent ratios for both acute angles. |
| **SWBAT** | |

**Sections 7.5 & 7.6 - Intro to Trig Ratios** **Target 7C**

February 3, 2014

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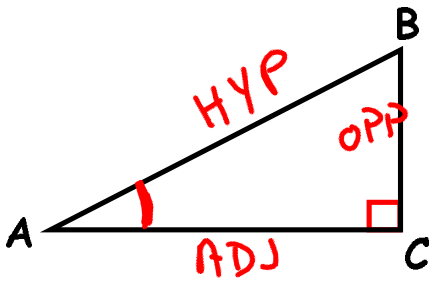
A ***trigonometric ratio*** is a ratio of the lengths of two sides of a right triangle.




<u>Three Trigonometric Ratios:</u>

Sine of angle A = $\sin\angle A = \frac{opposite\ leg}{hypotenuse}$

Cosine of angle A = $\cos\angle A = \frac{adjacent\ leg}{hypotenuse}$

Tangent of angle A = $\tan\angle A = \frac{opposite\ leg}{adjacent\ leg}$

Trigonometric ratios can only be used with what type of triangle?

SOH - CAH - TOA

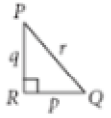
$S = \frac{O}{H}$ $C = \frac{A}{H}$ $T = \frac{O}{A}$

In Exercises 1–6, give each answer as a fraction in terms of $p$, $q$, and $r$.

**1.** $\sin P =$ _____ **2.** $\cos P =$ _____

**3.** $\tan P =$ _____ **4.** $\sin Q =$ _____

**5.** $\cos Q =$ _____ **6.** $\tan Q =$ _____




In Exercises 7–12, give each answer as a decimal accurate to three places.

**7.** $\sin T =$ _____ **8.** $\cos T =$ _____

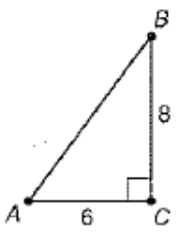
**9.** $\tan T =$ _____ **10.** $\sin R =$ _____

**11.** $\cos R =$ _____ **12.** $\tan R =$ _____

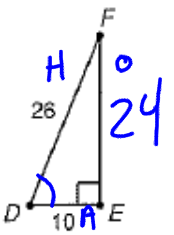

Answers: 1) $\frac{p}{r}$ 2) $\frac{q}{r}$ 3) $\frac{p}{q}$ 4) $\frac{q}{r}$ 5) $\frac{p}{r}$ 6) $\frac{q}{p}$ 7) 0.800 8) 0.600 9) 1.333 10) 0.600 11)0.80012) 0.750

Find the sin, cos, and tan for angle A and angle D:
(Hint: use Pythagorean theorem to find missing side)

**1.**




**2.**




Sin∠D

Cos∠D

Tan∠D

$\sin D = \frac{OPP}{HYP} = \frac{24}{26} = \frac{12}{13}$

1. $\sin A = \frac{4}{5}$
   $\cos A = \frac{3}{5}$
   $\tan A = \frac{4}{3}$
2. $\sin D = \frac{12}{13}$
   $\cos D = \frac{5}{13}$
   $\tan D = \frac{12}{5}$

Evaluating trig angles

Round to the nearest hundredth (2 places)

| | | | |
|---|---|---|---|
| 5. $\sin 52°$ | 6. $\cos 8°$ | 7. $\tan 72°$ | 8. $\sin 18°$ |
| 9. $\cos 58°$ | 10. $\tan 34°$ | 11. $\sin 62°$ | 12. $\cos 25°$ |

5) 0.79 6) 0.99 7) 3.08 8) 0.31

9)0.53 10) 0.68 11) 0.88 12) 0.91

## Summary Page:

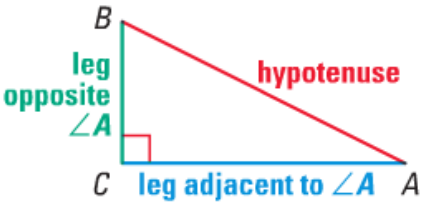
**KEY CONCEPT** *For Your Notebook*

### Sine and Cosine Ratios

Let $\triangle ABC$ be a right triangle with acute $\angle A$. The sine of $\angle A$ and cosine of $\angle A$ (written sin $A$ and cos $A$) are defined as follows:

$$\sin A = \frac{\text{length of leg opposite } \angle A}{\text{length of hypotenuse}} = \frac{BC}{AB}$$

$$\cos A = \frac{\text{length of leg adjacent to } \angle A}{\text{length of hypotenuse}} = \frac{AC}{AB}$$




**KEY CONCEPT** *For Your Notebook*

### Tangent Ratio

Let $\triangle ABC$ be a right triangle with acute $\angle A$. The tangent of $\angle A$ (written as tan $A$) is defined as follows:

$$\tan A = \frac{\text{length of leg opposite } \angle A}{\text{length of leg adjacent to } \angle A} = \frac{BC}{AC}$$